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PATENT
8005-1014

IN THE U.S. PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	Appeal No.
Takashi HORIKAWA	Conf. 3365
Application No. 10/757,426	Group 2123
Filed January 15, 2004	Examiner Dwin M. Craig

SYSTEM PERFORMANCE PREDICTION MECHANISM AND METHOD BASED ON SOFTWARE COMPONENT PERFORMANCE MEASUREMENTS

APPEAL BRIEF

MAY IT PLEASE YOUR HONORS:

1. Real Party in Interest

The real party in interest in this appeal is the current assignee, NEC Corporation of Tokyo, Japan.

2. Related Appeals and Interferences

None.

3. Status of Claims

Claims 1, 3-7, 9-12, 14-18, and 20-22 were rejected and are the subject of the present appeal. Claims 2, 8, 13, 19, 23-31, 22 (second occurrence), and claim 33 have been canceled.

4. Status of Amendments

No amendments were filed following the Final rejection of March 19, 2007. A Response was filed on June 22, 2007 and an Advisory Action issued on July 23, 2007.

5. Summary of Claimed Subject Matter

Claims 1 and 12 are the independent claims being appealed. They are generally similar. All references to page and line numbers herein are to the Substitute Specification.

Claim 1 defines a mechanism for predicting a performance of a system that combines a plurality of software components (page 3, lines 6-8). The invention makes it possible to predict system resource utilization without constructing a real system (page 18, lines 1-8).

The system includes component performance measurement means for previously measuring system resource utilizations of individual software components constituting the system and storing them in a performance database (Figure 1, element 20; page 8, lines 4-7 and page 8, line 16 through page 9, line 7).

The component performance measurement means have not been specified as being interpreted under §112, sixth paragraph. Nevertheless, the corresponding structure is element 20 in Figure 1, discussed at page 8, lines 4-7 and page 8, line 16

through page 9, line 7.

The system resource utilization measurements of the individual software components by the component performance measurement means are made by analyzing an event trace obtained by a measurement using both an application probe for detecting an event inserted in a test driver and occurring in a component to be measured and a kernel probe for detecting an event inserted in an operating system and occurring in a system to be measured (page 8, lines 16-26; Figures 6-8 and page 11, line 19 through page 14, line 8 provide a more detailed explanation).

The system also includes transaction performance prediction means for predicting system resource utilization for a transaction that is to be processed by the system (Figure 1, element 30; page 8, lines 7-11; Figures 2 and 9-11 discussed at page 15, line 25 through page 17, line 14) . This "means" searches the performance database (data stored therein coming from the component performance measurement means) in consideration of the software components and a processing content of the transaction.

The transaction performance prediction means have not been specified as being interpreted under §112, sixth paragraph. Nevertheless, the corresponding structure is element 30 in Figure 1, discussed at page 8, lines 7-11 and page 15, line 25

through page 17, line 14.

The system also includes system performance prediction means for predicting a system resource utilization for the entire system (Figure 1, element 40; page 8, lines 11-15). This "means" inputs the system resource utilizations of each transaction predicted by the transaction performance prediction means into a system performance prediction model that presents a system performance prediction (page 15, lines 10-24; note that the system performance prediction model is conventional - page 15, line 16, as explained at page 1, line 15 through page 3, line 2; see also page 17, lines 15-27).

The system performance prediction means have not been specified as being interpreted under §112, sixth paragraph. Nevertheless, the corresponding structure is element 40 in Figure 1, discussed at page 8, lines 11-15 and page 15, lines 10-24 and page 17, lines 15-27.

Claim 12 defines a method for predicting a performance of a system that combines a plurality of software components (page 3, lines 6-8) and is similar to claim 1 in that the steps of the method correspond to the limitations of the system of claim 1.

The method includes a step of previously measuring system resource utilizations of individual software components

constituting the system and storing them in a performance database (Figure 1, element 20; page 8, lines 4-7 and page 8, line 16 through page 9, line 7).

This step includes measuring the system resource utilizations of the individual software components by analyzing an event trace obtained by a measurement using both an application probe for detecting an event inserted in a test driver and occurring in a component to be measured and a kernel probe for detecting an event inserted in an operating system and occurring in a system to be measured (page 8, lines 16-26; Figures 6-8 and page 11, line 19 through page 14, line 8 provide a more detailed explanation).

The method also includes the step of predicting system resource utilization for a transaction that is to be processed by the system (Figure 1, element 30; page 8, lines 7-11; Figures 2 and 9-11 discussed at page 15, line 25 through page 17, line 14). This step searches the performance database in consideration of the software components and a processing content of the transaction.

The method also includes the step of predicting a system resource utilization for the entire system (Figure 1, element 40; page 8, lines 11-15). This step inputs the predicted system resource utilizations of each transaction into

a system performance prediction model that presents a system performance prediction (page 15, lines 10-24; note that the system performance prediction model is conventional - page 15, line 16, as explained at page 1, line 15 through page 3, line 2; see also page 17, lines 15-27).

6. Grounds of Rejection to be Reviewed on Appeal

Whether claims 1, 3-7, 9-12, 14-18, and 20-22 are unpatentable under 35 U.S.C. 101.

7. Argument

Rejection under 35 U.S.C. 101

Claims 1, 3-7, 9-12, 14-18, and 20-22 were rejected under 35 U.S.C. 101 because the claimed invention is alleged to be directed to non-statutory subject matter. The Examiner asserts that the claimed invention lacks a practical application of a judicial exception because the claimed invention fails to produce a tangible result and, more specifically, because the presentation of a system performance prediction remains in the abstract and fails to have real world value.

As explained in the MPEP §2106 IV.2.(2) (August 5, 2006), in order to satisfy Section 101 requirements, the claim must be directed to a practical application of a Section 101

judicial exception, which can be identified in various ways, one of which is that the claimed invention produces a useful, concrete and tangible result.

For an invention to be "useful" it must satisfy the utility requirement of Section 101. The Examiner implicitly acknowledges that this requirement has been met.

Another consideration is whether the invention produces a "concrete" result. The process must have a result that can be substantially repeatable or the process must substantially produce the same result again. The Examiner also implicitly acknowledges that this requirement has been met.

The "tangible" requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a Section 101 judicial exception, in that the process claim must set forth a practical application of that Section 101 judicial exception to produce a real-world result. "[A]n application of a law of nature or mathematical formula to a . . . process may well be deserving of patent protection." Diehr, 450 U.S. at 187, 209 USPQ at 8; see also Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 ("It is for the discovery or invention of some practical

method or means of producing a beneficial result or effect, that a patent is granted . . .").

The tangible result in the claims is argued below in the alternative. The first argument is that the tangible result in the claims is the presentation of the system performance prediction. This argument was made in response to the Official Action and is repeated below. Alternatively, the tangible result in the claims is the inputting of the system resource utilizations of each transaction to a system performance prediction model. That is, the tangible result comes before the actual prediction of system performance when the transaction results are input to the model.

First, it is argued that the tangible result provided by the claims is the presentation of the system performance prediction. The presentation of a system performance prediction is practical real-world result that allows the system designer to determine whether the design of the system is adequate. The Examiner asserts (paragraph 4.1 of the March 19, 2007 Official Action) that the presentation of a system performance prediction is "in the abstract." It is not clear what is meant by this phrase since there is nothing "abstract" about presenting a system performance prediction; the presentation tells the user how the system is expected to perform - e.g., relation between

throughput and response time (page 16, lines 19-23). A prediction of system performance is presented as a fact that is usable by the system designer to re-design or adjust the system whose performance is being predicted. As one of skill in the art will appreciate, comparing system performance predictions under different operating conditions or before and after re-designing the system will indicate whether the system is expected to operate as desired or whether the re-design has been effective. Presentation of a system performance prediction is a very valuable real-world tool.

The Examiner also indicates that the specification is silent regarding a means of presenting the system performance prediction (paragraph 4.1 of the March 19, 2007 Official Action). The method or device by which the system performance prediction is presented is clearly known to those of skill in the art and need not be disclosed. One of skill in this art is presumed to have certain computer basic skills, and one of the basic skills is presentation of results. As the artisan will appreciate, the system performance prediction may be presented on a screen, in print form, or other suitable format. To assert that one of skill in the art will understand all of the other complicated parts of the present invention, but not know how to present the results trivializes the patent application process.

The application is written for one of skill in the art and need not include that which is known.

In the Advisory Action of July 23, 2007 (third to last line of the Continuation Sheet), the Examiner acknowledges that "Performance prediction is useful" and argues that there is no presentation of the performance prediction discussed in the specification so that the result is not tangible. As noted above, it is the claims that must include the tangible result; and they do. Further, appellant acknowledges that the final system performance prediction is made using existing technologies (page 15, lines 15-19, with the prior art being discussed at page 1, line 15 through page 3, line 2). There is no dispute that the prior art systems presented a result, and thus it is implicit in the invention of claims 1 and 12 that the results are presented.

Alternatively, the tangible result in the claims is the system resource utilizations of each transaction that are input to a system performance prediction model (page 15, lines 19-24). The derivation of the system resource utilizations of each transaction are explained for one of skill in the art at page 16, line 8 through page 17, line 27. These results are "presented" in that they are made available to be input to the performance prediction model. These results are also useful

(they allow the performance prediction model to make a prediction) and concrete (they are repeatable for a given set of conditions).

Accordingly, the claims avoid the rejection under 35 U.S.C. 101 for either of these reasons.

In view of this, it is believed that the rejection of record cannot be sustained and that the same must be reversed and such is respectfully requested.

The claims involved in the appeal are set forth in the Claims Appendix.

There are no copies of evidence in the Evidence Appendix.

There are no copies of decisions in the Related Proceedings Appendix.

Respectfully submitted,

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October 22, 2007

8. Claims Appendix

The claims on appeal:

1. A mechanism for predicting a performance of a system that combines a plurality of software components, the system performance prediction mechanism based on software component performance measurements, comprising:

component performance measurement means for previously measuring system resource utilizations of individual software components constituting the system and storing them in a performance database;

transaction performance prediction means for predicting system resource utilization for a transaction to be processed by the system by searching the performance database in consideration of the software components and a processing content of the transaction; and

system performance prediction means for predicting a system resource utilization for the entire system by inputting the system resource utilizations of each transaction predicted by the transaction performance prediction means into a system performance prediction model that presents a system performance prediction,

wherein the system resource utilization measurements of the individual software components by said component

performance measurement means are made by analyzing an event trace obtained by a measurement using both an application probe for detecting an event inserted in a test driver and occurring in a component to be measured and a kernel probe for detecting an event inserted in an operating system and occurring in a system to be measured.

2. (canceled)

3. The system performance prediction mechanism according to claim 1, wherein the system resource utilization measurements of the individual software components by said component performance measurement means are made by using a system resource utilization measuring function provided by basic software.

4. The system performance prediction mechanism according to claim 1, wherein the system resource utilization prediction of the entire system by said system performance prediction means is made by determining operating conditions, under which the software components operate, from the software components and requests constituting the processing content of the transaction to be processed by the system, determining system resource utilizations by searching the performance database using each software component and operating conditions as keys, predicting the system resource utilization of the

transaction by combining results of searching for the system resource utilizations of all software components involved in processing of each transaction important in the system performance, and combining the obtained results and inputting them into the system performance prediction model.

5. The system performance prediction mechanism according to claim 1, wherein the system resource utilization prediction of the entire system by said system performance prediction means is made by inputting the system resource utilizations predicted by said transaction performance prediction means with respect to individual transactions into the system performance prediction model together with a transaction execution ratio if there are plural types of transactions to be processed by the system and their execution ratio is previously defined as system design information.

6. The system performance prediction mechanism according to claim 4, wherein the system resource utilization prediction of the entire system by said system performance prediction means is made by inputting the system resource utilizations predicted by said transaction performance prediction means with respect to individual transactions into the system performance prediction model together with a transaction execution ratio if there are plural types of

transactions to be processed by the system and their execution ratio is previously defined as system design information.

7. The system performance prediction mechanism according to claim 1, wherein the system resource utilization is represented by CPU time.

8. (canceled)

9. The system performance prediction mechanism according to claim 3, wherein the system resource utilization is represented by CPU time.

10. The system performance prediction mechanism according to claim 4, wherein the system resource utilization is represented by CPU time.

11. The system performance prediction mechanism according to claim 5, wherein the system resource utilization is represented by CPU time.

12. A method of predicting a performance of a system that combines a plurality of software components, the system performance prediction method based on software component performance measurements, comprising the steps of:

previously measuring system resource utilizations of individual software components constituting the system and storing them in a performance database;

predicting system resource utilization for a

transaction to be processed by the system by searching the performance database in consideration of the software components and a processing content of the transaction; and

predicting a system resource utilization for the entire system by inputting the predicted system resource utilizations of each transaction into a system performance prediction model that presents a system performance prediction,

wherein, in the step of measuring the system resource utilizations of the individual software components, the system resource utilizations of the individual software components are determined by analyzing an event trace obtained by a measurement using both of an application probe for detecting an event having been inserted in a test driver and occurred in a component to be measured and a kernel probe for detecting an event having been inserted in an operating system and occurred in a system to be measured.

13. (canceled)

14. The system performance prediction method according to claim 12, wherein, in the step of measuring the system resource utilizations of the individual software components, the system resource utilizations of the individual software components are determined by using a system resource utilization measuring function provided by basic software.

15. The system performance prediction method according to claim 12, wherein, in the step of predicting the system resource utilization of the entire system, the system resource utilization of the entire system is predicted by determining operating conditions, under which the software components operate, from the software components and requests constituting the processing content of the transaction to be processed by the system, determining system resource utilization by searching a performance database using each software component and operating conditions as keys, predicting the system resource utilization of the transaction by combining results of searching for the system resource utilizations of all software components involved in processing of each transaction important in the system performance, and combining the obtained results and inputting them into the system performance prediction model.

16. The system performance prediction method according to claim 12, wherein, in the step of predicting the system resource utilization of the entire system, the system resource utilization of the entire system is predicted by inputting the system resource utilizations predicted by said transaction performance prediction means with respect to individual transactions into the system performance prediction

model together with a transaction execution ratio if there are plural types of transactions to be processed by the system and their execution ratio is previously defined as system design information.

17. The system performance prediction method according to claim 15, wherein, in the step of predicting the system resource utilization of the entire system, the system resource utilization of the entire system is predicted by inputting the system resource utilizations predicted by said transaction performance prediction means with respect to individual transactions into the system performance prediction model together with a transaction execution ratio if there are plural types of transactions to be processed by the system and their execution ratio is previously defined as system design information.

18. The system performance prediction method according to claim 12, wherein the system resource utilization is represented by CPU time.

19. (canceled)

20. The system performance prediction method according to claim 14, wherein the system resource utilization is represented by CPU time.

21. The system performance prediction method

according to claim 15, wherein the system resource utilization is represented by CPU time.

22. The system performance prediction method according to claim 16, wherein the system resource utilization is represented by CPU time.

23-31. (canceled)

22. (second occurrence, canceled)

33. (canceled)

9. Evidence Appendix

None.

10. Related Proceedings Appendix

None.